

eAppendix 2. ICD-10 codes used to identify comorbidity risk factors for COVID-19 hospitalization or death

Condition	ICD-10 codes
Asthma	J45.x, J46.x
Cancer	C00.x-C26.x, C30.x-C34.x, C37.x-C41.x, C43.x, C45.x-C58.x, C60.x-C76.x, C81.x-C85.x, C88.x, C90.x-C97.x (malignancy) C77.x-C80.x (metastatic solid tumor)
Cerebrovascular disease	G45.x, G46.x, (TIA/vascular syndromes) H34.0x, H34.1x (transient or central retinal artery occlusion) I60.x, I61.x, I62.x, I63.x, I64.x, I65.x, I66.x, I67.x, I68.x I69.x (cerebrovascular diseases – stroke, hemorrhage, infarction, occlusion, stenosis)
Chronic kidney diseases	I12.xx, I13.xx (hypertensive renal disease) N03.2-N03.7 (chronic nephritic syndrome) N05.2-N05.7 (unspecified nephrotic syndrome) N18.xx, N19.x (chronic kidney disease and failure) N25.0 (impaired renal tubular function) Z49.xx (dialysis) Z99.2 (dependence on renal dialysis) Q61.x (cystic kidney disease), E10.2, E11.2, E12.2, E13.2, E14.2 (DM with renal complications)
Chronic lung disease (limited to bronchiectasis, COPD, ILD, pulmonary embolism, pulmonary HTN)	J47.x (bronchiectasis) J43.x, J44.x (COPD) I27.20 (pulmonary hypertension) I26.x (pulmonary embolism) J84.x (interstitial pulmonary diseases)
Chronic liver disease (cirrhosis, non-alcoholic fatty liver disease, alcoholic liver disease, autoimmune hepatitis)	I85.0, I85.9, I86.4, I98.2, I98.3, (Esophageal or gastric varices – signs of severe liver disease) K70.4, K71.1, K72.1, K72.9, (hepatic failure) K70.0 (alcoholic fatty liver disease), K70.9 (unspecified alcoholic liver disease, K70.30 (alcoholic cirrhosis of liver without ascites) K76.0 (fatty change of liver) K74.5 (biliary cirrhosis), K74.69 (other cirrhosis) K76.5 (hepatic veno-occlusive disease) K76.6 (portal hypertension) K76.7 (hepatorenal syndrome) K75.4 (Autoimmune hepatitis)
Diabetes mellitus (type 1 and 2)	E10.xx (DM1), E11.xx (DM2), E12.xx (malnutrition DM), E13.xx (other DM), E14.xx (unspecified DM), O24.xx (GDM)
Disabilities, including Down Syndrome	F79 (unspecified intellectual disabilities) F72 (severe intellectual disabilities) F73 (profound intellectual disabilities) F70 (mild intellectual disabilities)

<ul style="list-style-type: none"> • Intellectual & developmental disabilities • Down syndrome • Dependence for basic ADLs • Learning disabilities • ADL impairments • Spinal cord injuries • Cerebral palsy • Congenital malformations • ADHD 	<p>F71 (moderate intellectual disabilities) Q90 (down syndrome) Z73.6 (limitation of activities due to disability) G81.x, G82.x (hemiplegia, paraplegia, or quadriplegia) S24.xx (injury of thoracic spinal cord) S34.xx (injury of lumbar and sacral spinal cord) S14.xx (injury of cervical spinal cord) G80.x, (cerebral palsy) Q89.9 (congenital malformation, unspecified) F90.x (ADHD)</p>
<p>HIV/AIDS</p>	<p>B20.x, B97.35, R75.x, Z21.x</p>
<p>Heart conditions (such as heart failure, coronary artery disease, or cardiomyopathies)</p>	<p>109.81 (rheumatic heart failure) I11.0, I13.0, I13.2 (hypertensive heart disease with heart failure) I21.x, I22.x, I23.x, I25.x (ischemic – excluding angina and other acute ischemic heart disease) I42.x, I43.x, (cardiomyopathy) I50.x (heart failure) I25.10 (coronary artery disease)</p>
<p>Primary immunodeficiency</p>	<p>D70.0 (congenital agranulocytosis) D71 (Functional disorders of polymorphonuclear neutrophils; <i>includes chronic granulomatous disease</i>) D80.x (Immunodeficiency with predominantly antibody defects) D81.x (combined immunodeficiencies) D82.x (Immunodeficiency associated with other major defects) D83.x (common variable immunodeficiency) D84.0 (LFA-1 defect) D84.1 (complement defects)</p>
<p>Mental health conditions (mood disorders, including depression, and schizophrenia spectrum disorders)</p>	<p>F39 (unspecified mood disorder) F34.9 (persistent mood disorder, unspecified) F32.A (depression, unspecified) F33.x (major depressive disorder) F20.x (schizophrenia) F21.x (schizotypal disorder) F25.9 (schizoaffective disorder, unspecified) F22.x (delusional disorders) F20.81 (schizophreniform disorder) F23 (brief psychotic disorder)</p>
<p>Neurologic conditions (limited to dementia)</p>	<p>F00 (Dementia in Alzheimer disease) F01.xx (vascular dementia) F02.xx (dementia in other diseases classified elsewhere) F03.xx (unspecified dementia)</p>

	G30.x, (Alzheimer's disease) G31.1 (frontotemporal dementia)
Overweight or obesity	E66.xx, Z68.25-Z68.29, Z68.3, Z68.4
Pregnancy Check for any pregnancy or delivery related codes during COVID risk period.	Oxx.xxx, Z33.x, Z34.xx, Z35.x, Z37.x, Z38.xx, Z39.0, Z3A.xx
Solid organ or blood stem cell transplantation	Z94.xx
Autoimmune disease	See comprehensive autoimmune ICD codes below (modified from ZOE conditions)
Multiple sclerosis	G35
Inflammatory polyneuropathy including Guillain-Barré syndrome, Miller Fisher syndrome and other variants	G61.0 (Guillain-Barré) G61.81 G61.82 G61.9
Myasthenia gravis (MG), including Lambert-Eaton myasthenic syndrome (LE)	G70.0 (MG) G70.00 (MG) G70.01 (MG) G70.80 (LE)
Systemic lupus erythematosus and associated conditions	M32.x L93.x
Systemic Scleroderma (Systemic sclerosis), including diffuse systemic form and CREST syndrome (Limited cutaneous systemic sclerosis)	M34.x
Idiopathic inflammatory myopathies, including Dermatomyositis, Polymyositis	M33.x
Rheumatoid arthritis and associated conditions including Juvenile chronic arthritis and Still's disease)	M05.x M06.x M08.x M09.x M35.1 M35.9
Chronic postrheumatic arthropathy, palindromic rheumatism	M12.0 M12.3
Polymyalgia rheumatica	M35.3 M31.5
Spondyloarthritis, including ankylosing spondylitis, reactive arthritis (Reiter's Syndrome) and undifferentiated spondyloarthritis	M45.x (Ankylosing spondylitis) M02.9 (Reactive arthritis)
Sacroiliitis, inflammatory spondylopathy	M46.1 (Sacroiliitis, Not Elsewhere Classified) M46.8 (Other Specified Inflammatory Spondylopathies) M46.9 (Inflammatory Spondylopathy, Unspecified)
Relapsing polychondritis	M94.1 (Relapsing polychondritis)

Psoriatic and enteropathic arthritis; psoriasis	M07.x (Enteropathic arthropaties) M07.60 L40.x (Psoriasis) L40.9 L40.50
Vitiligo	L80
Autoimmune bullous skin diseases (including pemphigus, pemphigoid and dermatitis herpetiformis)	L10.x (Pemphigus) L10.9 L12.x (Pemphigoid) L12.9 L13.0
Erythema nodosum	L52
Alopecia areata	L63.x (Alopecia areata) L63.0 L63.1 L63.2 L63.8 L63.9
Scleroderma, sclerodactyly	L94.0 (Localized scleroderma (morphea)) L94.1 (Linear scleroderma) L94.3 (Sclerodactyly)
Autoimmune hepatitis	K75.4
Primary biliary cirrhosis	K74.3
Inflammatory bowel disease, including Crohn's disease, ulcerative colitis, microscopic colitis, ulcerative proctitis	K50.x (Crohn's disease) K50.90 K50.919 K51.x (Ulcerative colitis) K51.90 K51.919 K52.83x (Microscopic colitis) K52.839 K51.2x (Ulcerative (chronic) proctitis) K51.20 K51.219
Celiac disease	K90.0
Autoimmune thyroiditis (including Hashimoto thyroiditis)	E06.3 (Autoimmune thyroiditis)
Primary adrenocortical insufficiency	E27.1
Polyglandular autoimmune syndrome	E31.0
Large vessels vasculitis including giant cell arteritis such as Takayasu's arteritis and temporal arteritis.	M31.6 M31.4
Medium sized and/or small vessels vasculitis including: polyarteritis nodosa, Kawasaki's disease,	M30.x M31.0-M31.3, M31.7 I73.1

microscopic polyangiitis, Wegener's granulomatosis, Churg–Strauss syndrome (allergic granulomatous angiitis), Buerger's disease (thromboangiitis obliterans), necrotizing vasculitis and anti-neutrophil cytoplasmic antibody (ANCA) positive vasculitis (type unspecified), Henoch-Schonlein purpura, Behcet's syndrome, leukocytoclastic vasculitis.	D69.0 M35.2
Autoimmune hemolytic anemia	D59.1x (Other autoimmune hemolytic anemias) D59.10 D59.11 D59.12 D59.13 D59.19 D59.0
Immune thrombocytopenic purpura	D69.3
Pernicious anemia	D51.0
Autoimmune aplastic anemia	D61.3
Sarcoidosis	D86.x (Sarcoidosis) D86.9
Sjögren's syndrome	M35.0x (Sjögren's syndrome)